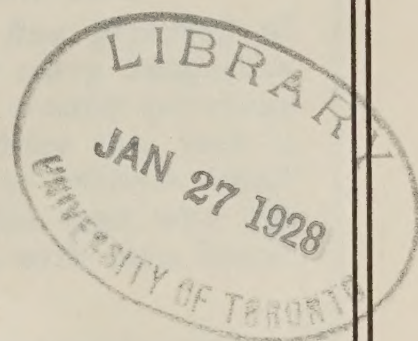


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SCREENINGS AS A FEED FOR LIVE STOCK

By W. G. DUNSMORE, B.S.A.,
ASSISTANT ANIMAL HUSBANDMAN




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SCREENINGS AS A FEED FOR LIVE STOCK

A by-product of the wheat industry available to Canadian stockmen.

Now commonly graded into the following classes: recleaned elevator screenings, oat scalpings, and refuse screenings.

When ground it makes a safe and excellent meal for live stock.

Experiments show that the value of recleaned elevator screenings is equal to that of good meal mixtures of much greater cost.

Emphasis should be laid on the necessity of *fine grinding* of elevator screenings. As will be seen, this feed may carry dangerous weed seeds. Custom ground screenings is generally a safer purchase than screenings in bulk. Home ground feeds (as where this feed is purchased in bulk) are frequently coarse enough to include small unground weed seeds, that may germinate later. The man who has a high regard for clean farming must use screenings with care. Insist on fine grinding.

WHAT IS SCREENINGS?

Screenings consists of the broken grains, weed seeds, chaff, fine straw, and dust, or dockage as it is termed, which is removed from practically all grain that is delivered to the terminal elevators. The total screenings removed from the grain constitute about $1\frac{1}{2}$ to $2\frac{1}{2}$ per cent of the total grain received. This is then recleaned and classified into recleaned elevator screenings, oat scalpings and refuse screenings. When for one reason or another it is impractical to grade the screenings into one or other of these classifications a fourth grade is employed, namely, elevator screenings. If the percentage of weed seeds is in excess of the prescribed amount this latter classification is used.

The various classes of screenings have become recognized unofficially by the Grain Inspection Department and most elevators are recleaning their screenings into the classes named.

1. Recleaned elevator screenings, commonly referred to in the grain trade as "bucks" or "Buckwheat screenings", is now fairly uniform in physical composition, containing about 50 to 70 per cent of wild buckwheat, 20 to 40 per cent broken or shrunk wheat, some wild oats, and not over 3 per cent of small weed seeds.

2. Oat scalpings or "mill oats" is a still more stable by-product, the variation here being represented largely by the difference in the weight per measured bushel. Because of seasonal variations this may vary from less than 30 pounds to more than 40 pounds. Oat scalpings contain about 75 per cent of wild oats, 15 per cent of domestic oats, a small percentage of barley and an occasional wheat kernel.

3. Refuse screenings of late years have been in great demand for export to the United States for the purpose of increasing their own light weight product. It consists of small weed seeds, chaff and the dust and dirt accumulating from recleaning. The weight is between 23 and 30 pounds per bushel.

4. Elevator screenings may include any screenings not falling into the three above classifications, provided the required minimum percentage of wild buckwheat and wild oats is not exceeded. Screenings rejected for excess weed seeds are usually classed as elevator screenings.

Periodic surveys of complete screenings made by the Board of Grain Commissioners have found that the minimum content of recleaned elevator screenings is 30 per cent, and of oat scalpings 5 per cent of the complete screenings.

A somewhat different classification of screenings was originally adopted when this by-product first came onto the market, namely, recleaned screenings, scalpings, succotash flax, and blackseeds. The succotash flax consisted of about one-third flax of good commercial grade; the recleaned screenings consisted of such coarse grains as wheat, oats, barley, etc.; while the blackseeds consisted chiefly of seeds from pig-weed, lambsquarters, and the mustards. These were the classes of screenings fed in the tests previous to 1919, recorded in this pamphlet.

COMPOSITION OF RECLEANED ELEVATOR SCREENINGS AND OAT SCALPINGS¹

		Protein	Fat	Fibre
Recleaned elevator screenings.....	Maximum	16.68	9.66	14.47
	Minimum	12.00	1.77	2.55
	Average	14.40	4.05	6.68
Oat scalpings.....	Maximum	15.85	5.96	15.43
	Minimum	11.51	3.68	6.83
	Average	13.19	4.36	12.27

GRINDING SCREENINGS

The complete elevator screenings may contain such a dangerously high percentage of weed seeds that grinding would be imperative in order to prevent the spreading of noxious weeds. This applies also, though in lesser degree, to the recleaned screenings, and it is distinctly advisable that this product be ground finely even where intended for sheep or poultry.

It is practically impossible to grind complete elevator screenings sufficiently fine in the ordinary grinder to destroy all of the smaller seeds. Recleaned screenings, however, from which the greater part of the small seeds have been removed, may be safely used after being subject to fine chopping or grinding. That this feature of fine pulverizing is highly important will be appreciated by owners of clean farms.

APPEARANCE OF RECLEANED ELEVATOR SCREENINGS

The prospective purchaser of this material must not be misguided by its appearance either whole or ground. The unground product would seem to contain an alarming quantity of wild buckwheat. This weed seed has, however, a feeding value almost equal to that of the cultivated variety. In the ground form the meal is very dark in appearance, due entirely to the colour of the wild buckwheat.

¹ The writer is indebted to F. T. Shutt, M.A., D.Sc., F.I.C., the Dominion Chemist, for these analyses.

RESULTS OF FEEDING EXPERIMENTS

SCREENINGS FOR FATTENING HOGS

In 1914-15 experiments were carried on at Ottawa, to ascertain the value of complete elevator screenings and various separations thereof, as hog-feeds. The results obtained from feeding a standard ration, one composed of recleaned screenings and a third of complete elevator screenings and feed flour, with milk in all cases, indicated a high value, particularly for recleaned screenings. All screenings were finely ground.

Lot I—fed a standard ration composed of shorts, 3 parts; ground corn, 3 parts; oil meal, 1 part—made the heaviest gains of all lots (1.02 pounds per day per pig), requiring 2.5 pounds meal and 3.9 pounds skim-milk per pound gain.

Lot II—fed recleaned (buckwheat) screenings—stood slightly lower than Lot I in gains (0.90 pounds per pig per day), requiring 2.5 pounds screenings and 4.5 pounds milk per pound gain. With the standard meal at \$32 per ton, recleaned screenings would be worth \$31.52—practically the equivalent of the standard meal. A comparison of present prices on these commodities would prove of further interest to the hog-feeder.

Lot III—fed complete elevator screenings, 3 parts; feed flour, 1 part—stood lowest of the three in gains (.48 pounds per pig per day), requiring 3.9 pounds of the screenings mixture and 8.5 pounds milk per pound gain. With meal at \$32 per ton; roots, \$2 per ton; and skim-milk, \$4 per ton, the mixture of complete screenings, 3 parts, and feed flour, 1 part, thus showed a valuation of only \$20.48 per ton.

Briefly, the value of blackseeds proved low, even when added in small quantities to well-balanced rations. It is apparently distinctly unpalatable and unpleasant for hogs, and should not be fed in quantities larger than would be contained in the recleaned screenings.

At Brandon in 1919 and again 1920, recleaned elevator screenings and barley meal were compared, and these feeds comprised the major part of the two meal rations.

The results were as follows:—

RECLEANED SCREENINGS VS. BARLEY

Year	Lot	Feed compared	Average daily gain per hog	Meal eaten per pound gain
			lb.	lb.
1919.....	1	Barley.....	1.5	4.46
1919.....	2	Screenings.....	1.54	4.53
1920.....	3	Barley.....	1.07	4.73
1920.....	4	Screenings.....	1.27	3.67

In this test screenings gave more rapid gains and also a lower feed consumption per pound of gain than did the barley.

At the Lennoxville Experimental Station a number of tests were conducted in which recleaned elevator screenings were compared with other feeds. In 1921 an experimental test indicated that 100 pounds of recleaned elevator screenings were equal in feeding value to 79 pounds of a mixed meal ration composed of ground oats, ground corn, middlings, and 3.6 per cent of oil meal.

In 1923 a ration consisting of 80 per cent ground elevator screenings, 10 per cent ground oats and 10 per cent bran was compared with a ration including 75 per cent ground corn, 15 per cent ground oats and 10 per cent bran. Until four months of age both lots were fed similar rations. Both rations were supplemented with skim-milk.

In the following year a comparison of ground elevator screenings, barley and a mixed meal ration was made. The mixed meal consisted of barley, 6 parts; middlings, 2 parts; screenings, 1 part; and linseed oil meal, 1 part. In addition to the meal, roots and skim-milk were fed to all lots. The results for these three tests are summarized below.

RECLEAVED SCREENINGS VS. CORN VS. BARLEYVS. MIXED MEAL

Year	Lot	Feeds compared	Average daily feed eaten per pound gain			
			Gain per hog	Meal	Roots	Milk
1921.....	1	Screenings.....	0.988	5.0
	2	Mixed meal.....	1.23	3.98
1923.....	1	Screenings.....	1.46	4.19	6.81
	2	Ground corn.....	1.32	3.62	6.69
1924.....	1	Screenings.....	1.26	4.39	1.22	3.17
	2	Barley.....	1.42	3.38	1.09	2.81
	3	Mixed meal.....	1.47	3.14	1.05	2.72

In these tests screenings, when fed alone, compared very favourably with the mixed meal and barley rations. It, however, gave even better results when fed in mixtures than when comprising the entire meal ration. In the 1919 test 100 pounds of the mixed meal were equal to 125.6 of recleaned elevator screenings. In the 1924 test with the mixed meal valued at \$32 per ton, milk at 20 cents per hundred, and roots at \$4 per ton the recleaned elevator screenings had a relative value of \$22.10 and the barley \$29.54.

The Summerland Experimental Station compared recleaned elevator screenings, barley, and oats during the winter of 1920-21. These feeds were fed as constituent parts of the basic meal ration; which consisted of 3 parts shorts, 2 parts bran, and 1 part feed flour. In addition an average of .62 of a pound of silage was fed each pig daily.

RECLEAVED SCREENINGS VS. BARLEY VS. OATS

Lot	Feeds compared	Average daily gain per hog	Feed eaten per pound gain	
			Meal	Silage
		lb.	lb.	lb.
1.....	35 per cent of screenings.....	1.55	3.46	0.40
2.....	46 per cent of screenings.....	1.42	4.10	0.44
3.....	Barley.....	1.55	4.0	0.40
4.....	Oats.....	1.19	4.63	0.52

In 1925 a further test of recleaned elevator screenings was made with Schumacher feed at this Station. These rations were supplemented with about 7½ per cent of tankage and also roots in addition.

RECLEAVED SCREENINGS VS. SCHUMACHER

Lot	Feeds compared	Average daily gain per hog	Feed eaten per pound gain		
			Meal	Roots	Tankage
		lb.	lb.	lb.	lb.
1.....	Screenings.....	1.26	4.37	1.33	0.32
2.....	Schumacher.....	1.17	4.08	1.43	0.31

A further test in 1926 at this Station compared recleaned elevator screenings with a meal mixture consisting of corn meal, 3 parts; ground oats, 2 parts; middlings, 2 parts; bran, 2 parts; and oilcake meal, 1 part. These meal rations were supplemented with skim-milk, tankage and roots.

RECLEANED SCREENINGS VS. MIXED MEAL

Lot	Feeds compared	Average daily gain per hog	Feed eaten per pound gain			
			Meal	Milk	Tankage	Roots
		lb.	lb.	lb.	lb.	lb.
1.....	Screenings.....	1.31	5.54	1.34	0.27	0.23
2.....	Mixed meal.....	1.26	6.40	1.05	0.42	0.16

Deductions.—In all these tests recleaned elevator screenings showed a high feeding value, comparing favourably with good meal mixtures and with such single feeds as barley, corn and oats.

The outstanding feature throughout all the tests is the unusually high rate of gain made by the hogs on screenings, these only being exceeded by lots on good meal mixtures. In economy of gains the average for the lots fed recleaned elevator screenings shows a feed consumption of 4.42 pounds of meal, 1.26 pounds of skim-milk and .40 of a pound of roots and silage per pound of gain as compared with 4.31 pounds of meal, 1.33 pounds of skim-milk and .46 of a pound of roots and silage for all other lots.

RECLEANED SCREENINGS FOR GROWING PIGS

In 1918 further experimental evidence was collected in which recleaned screenings show in a favourable light. Conducted in duplicate, the results given are an average of the two experiments.

Lot I—fed recleaned screenings and skim-milk—gained 1 pound per pig per day; total gains being the highest of all lots fed. Pigs required 2.8 pounds meal and 6 pounds skim-milk daily per pound gain.

Lot II—fed recleaned screenings and shorts, equal parts, and skim-milk—stood considerably lower in total gains, individual daily gains at the rate of .79 pounds being made. Meal was required at the rate of 2.6 pounds, and milk 7.2 pounds per pound gain.

Lot III—fed recleaned screenings 400 pounds, oil meal 50 pounds and skim-milk—stood between the previous lots in gains. Daily gains of .85 pounds per pig were made, requiring 2.1 pounds meal and 6.8 pounds skim-milk per pound gain.

Lot IV—fed recleaned screenings, 400 pounds; tankage, 50 pounds and milk—made lowest gains of the four lots. Daily gains per pig were .76 pounds, requiring 2.6 pounds meal and 8.6 pounds milk per pound gain.

Deductions.—Lots fed recleaned screenings and skim-milk ate more feed, made higher gains and were in better bloom and finish than pigs of similar initial quality and size, fed rations containing recleaned screenings supplemented by higher priced concentrated feeds. Realizing the fallacy of specific deductions from this one test, the findings of this experiment are, at least, amply borne out by the feeding tests previously quoted.

OAT SCALPINGS FOR HOGS

At Ottawa during the winter of 1924-25, oat scalpings were fed to growing pigs at the rates of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ of the meal ration. The basic meal ration to which these various amounts of screenings were added, included equal parts of oats, barley, shorts, middlings, 3 per cent of oil meal, 5 per cent of tankage, and skim-milk. The test continued for 90 days.

OAT SCALPINGS FED AT DIFFERENT RATES

Lot	Rate of feeding oat scalpings	Average daily gain per day	Feed eaten per pound gain	
			Meal	Skim-milk
		lb.	lb.	lb.
1.....	No scalpings.....	1.20	2.06	4.97
2.....	of ration.....	0.955	2.38	5.69
3.....	of ration.....	0.924	2.46	5.81
4.....	of ration.....	0.933	2.38	5.83
5.....	of ration.....	0.914	2.66	5.95

With the basic meal ration valued at \$39.90 per ton and the skim-milk at 20 cents per hundred, the oat scalpings had a value of \$12.68 in the 12.5 per cent ration, \$7.92 in the 25 per cent ration, \$21.90 in the 37.5 per cent ration, and \$19 in the 50 per cent ration. The oat scalpings, therefore, have a feeding value of not more than half that of a good meal mixture for feeding growing pigs.

SCREENINGS FOR STEER FEEDING

The Lennoxville Experimental Station conducted tests with recleaned elevator screenings for five years ending 1926, comparing this feed with mixed meal rations for fattening steers. The average duration of each feeding period was 188 days, the steers averaging over 1,200 pounds when finished. Some valuable information was derived from these tests.

AVERAGE OF FIVE YEARS' EXPERIMENTS

Lot	Feeds compared	Average daily gain per steer	Feed eaten per pound gain		
			Meal	Hay	Ensilage
		lb.	lb.	lb.	lb.
1.....	Screenings.....	1.21	3.44	8.46	22.91
2.....	Mixed meal.....	1.21	3.53	8.49	23.21

The screenings here had a slightly greater feeding value, pound for pound, than the mixed meal rations. In these tests 6,289 pounds of screenings were equal to 6,454 pounds of mixed meal, 56 pounds of hay, and 553 pounds of ensilage and with these feeds valued at \$36 for meal, \$8 for hay, and \$5 for ensilage per ton, the recleaned elevator screenings had a relative value of \$37.44 per ton.

SCREENINGS FOR DAIRY CATTLE

In 1915, experiments were carried out at Ottawa with the feeding of screenings to dairy cattle. Complete pulverized screenings and the separation already described as blackseeds, were used.

1. Comparing the results of feeding a well balanced meal mixture with those obtained from feeding a meal mixture made up of two-thirds of the above and one-third complete screenings, little difference in production was evident in two-week feeding periods. Fed in the above proportions, the complete screenings had a value of \$47 per ton, with the meal mixture valued at \$36.

2. Blackseeds fed as one-third of the ration proved a distinct detriment.

3. Recleaned (buckwheat) screenings was not fed in this test. The complete screenings proved very unpalatable until the animals became more or less accustomed to the change. This unpalatability, or bitter flavour, was due to the presence of the blackseeds which, having been removed from recleaned screenings, should render the latter a valuable food for the dairy cow, worth fully as much as a good meal mixture, when not exceeding one-third of the total meal fed.

SCREENINGS FOR FATTENING LAMBS

The absolute necessity of fine pulverization of any elevator by-product in order to destroy weed seeds, has been discussed. This treatment, unfortunately, renders such material rather distasteful to sheep, which, as a class, prefer a coarser, less dusty food. Nevertheless, good results were obtained at Ottawa in 1915, with the winter feeding of lambs.

A standard meal mixture was used consisting of oats, 2 parts; bran, 2 parts; oil meal, 1 part; with clover hay and ensilage.

Two parts of the above fed with 1 part complete ground screenings, gave better results than did the standard ration, in this case the screenings having a value of \$51 per ton with the standard meal mixture valued at \$33 per ton.

Complete screenings fed alone showed a comparative value of \$32 per ton. Screenings with blackseeds removed, fed alone, attained a value of \$47.66, showing the value of removing this undesirable element. As with hogs and cattle, the feeding of blackseeds in any part of the ration proved a distinct detriment. Recleaned screenings which would grade higher than complete screenings with blackseeds removed should, on these findings, prove a high-class feed for fattening lambs.

SUMMARY OF EXPERIMENTS

SCREENINGS FOR SWINE

Recleaned elevator screenings is an excellent feed for swine, particularly for growing and fattening pigs, but is not so useful for very young or newly weaned pigs. It is particularly useful for the encouraging of rapid gains, and in economy of production compares favourably with good grain rations composed of mixed meals.

Oat scalpings have a feeding value in the ration of growing pigs of not more than half that of a good mixed meal. It is a feed relatively high in fibre and, therefore, of less value for fattening.

Refuse screenings or blackseeds have little or no feeding value in the rations of swine.

SCREENINGS FOR DAIRY CATTLE

Complete screenings proved to be a valuable feed in the meal ration of dairy cows when constituting one-third of the meal ration, but proved rather unpalatable until the cows became accustomed to the change because of the presence of the weed seeds.

SCREENINGS FOR STEER FEEDING

Recleaned elevator screenings proved to be the equal of a good mixed meal for fattening steers.

SCREENINGS FOR SHEEP

For fattening lambs complete screenings proved to be a valuable addition to the meal ration when comprising one-third of this ration. When fed alone, it however, was of slightly less value than a mixed meal ration of good variety and quality.

